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Brisbane Australia

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## **COVER LETTER**

We wish to submit this occasional piece for review at the British Journal of Sports Medicine.

This article has not been published elsewhere and it is not currently under review at another journal.

## **TITLE**

The financial cost of hamstring strain injuries in the Australian Football League.

## **AUTHORS**

Jack Hickey<sup>a</sup> (M.Clin.Ex.Phys), Anthony J. Shield<sup>b,c</sup> (PhD), Morgan D. Williams<sup>d</sup> (PhD),  
David A. Opar<sup>e</sup> (Hons).

<sup>a</sup>Exercise Physiologist at MD Health Pilates, Melbourne, Australia

<sup>b</sup>School of Exercise and Nutrition Science, Queensland University of Technology, Brisbane,  
Australia

<sup>c</sup>Institute of Health and Biomedical Innovation, Queensland University of Technology,  
Brisbane, Australia

<sup>d</sup>Faculty of Health, Sport and Science, University of South Wales, Pontypridd, Wales.

<sup>e</sup>School of Exercise Science, Australian Catholic University, Melbourne, Australia

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## **CORRESPONDING AUTHOR**

David A. Opar

d.opar@qut.edu.au

Tele: 61 433 609 793

## **CONTRIBUTORSHIP**

Data collection, analysis and manuscript preparation – Hickey, Opar, Williams, Shield.

Guarantor of overall content – Opar.

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NA

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## **ABSTRACT**

**Background/Aim:** Hamstring strain injuries (HSIs) have remained the most prevalent injury in the Australian football league (AFL) over the past 21 regular seasons. The impact of HSIs in sport is often expressed as regular season games missed due to injury. However the financial cost of athletes missing games due to injury has not been investigated. The aim of this report is to estimate the financial cost of games missed due to HSIs in the AFL. **Method:** Data was collected using publically available information from the AFL's injury report and the official AFL annual report for the past 10 competitive AFL seasons. Average athlete salary and injury epidemiology data was used to determine the average yearly financial cost of HSIs for AFL clubs and the average financial cost of a single HSI over this time period. **Results:** Across the observed period, average yearly financial cost of HSIs per club increased by 71% compared to a 43% increase in average yearly athlete salary. Over the same time period the average financial cost of a single HSI increased by 56% from \$25,603 in 2003 to \$40,021 in 2012, despite little change in HSI rates during the period. **Conclusion:** The observed increased financial cost of HSIs was ultimately explained by the failure of teams to decrease HSI rates, but coupled with increases in athlete salaries over the past 10 season. The information presented in this report will highlight the financial cost of HSIs and other sporting injuries, raising greater awareness and the need for further funding for research into injury prevention strategies to maximise economical return for investment in athletes.

## **KEY WORDS**

Sports injury, economics

## **INTRODUCTION**

Hamstring strain injuries (HSIs) are highly prevalent in sport, particularly in the elite Australian Football League (AFL). For the past 21 competitive seasons, the AFL has produced an annual injury report documenting injury statistics during the regular season.<sup>1</sup> The most recently published report, confirms that HSIs have remained the most common injury in the AFL, accounting for an average of 16.5% of all new injuries with a recurrence rate of 20% over the past 10 seasons. In the AFL's annual injury report, the impact of HSIs is expressed as the number of regular season games missed due to injury however the financial cost of this athlete unavailability has not been investigated. AFL clubs pay their athletes an annual salary, therefore an athlete who is unavailable to participate due to injury is effectively providing less return for their club's financial investment. The aim of this report was to examine, using publically available information, the financial cost of athletes missing regular season games due to HSIs over the past 10 seasons, for AFL clubs. This information has important implications for the AFL and other elite sporting clubs and organisations, who are required to evaluate the cost:benefit ratio of all their investments and who often neglect the financial burden of injury.

## **METHODS**

Data for HSI rates and average athlete salaries in the AFL were collected for the most recent 10 competitive seasons (2003 to 2012) from the AFL's injury report<sup>1</sup> and the official AFL annual report respectively. Average weekly athlete salary was determined by dividing average yearly athlete salary with the number of regular season games each season. The average yearly financial cost of games missed due to HSIs per club was calculated, by multiplying the average total games missed per season due HSIs (HSI prevalence) with average weekly athlete salary. The average financial cost of a single HSI was calculated by multiplying the average games missed due to HSIs (HSI severity) with average weekly athlete salary.

## **RESULTS**

The average yearly financial cost of games missed due to HSIs for each AFL club increased by 71% from \$148,816 in 2003 to \$245,842 in 2012 (Figure 1). In comparison, average yearly athlete salary in the AFL has only increased by 43% from \$176,019 in 2003 to \$251,559 in 2012 (Figure 1). Whilst the increase in yearly athlete salary has been almost linear, the yearly financial cost of HSIs is much more volatile as it influenced by the year to year variation in HSI prevalence. For example in 2008 the yearly financial cost of HSIs was 17% greater than the average yearly athlete salary due to the high prevalence of HSIs that season. Yet on average, the yearly financial cost of HSIs is relatively similar to the average yearly athlete salary for that season. The average financial cost of a single HSI has increased from \$25,603 in 2003 to \$40,021 in 2012, an increase of 56% (Figure 2). This increase in cost is despite average HSI incidence (number of new HSI per club) per season displaying no overall change from 5.7 in 2003 to 5.7 in 2012, with little variation during the years in between (Figure 2).



## **DISCUSSION**

The main finding of this report is that despite little change in HSI rates, the financial cost of HSIs for AFL clubs has increased over the past 10 regular seasons, in absolute terms. Interestingly each AFL club, on average, loses the equivalent of one average athlete's yearly salary as a result of athlete unavailability due to HSIs every season. Or in other terms, clubs are paying an average athlete's yearly salary for no on-field return for their investment. This relatively high cost is largely due to the fact that HSI rates have failed to decline during this time whilst average yearly athlete salary has continued to rise. And due to the varying nature of HSI prevalence year to year, this cost can be greater in years when HSI prevalence is particularly high, such as the 2008 AFL season. Therefore budgeting for costs related to HSIs for AFL clubs is a difficult and risky task.

This report may even underestimate the total financial cost of HSIs, due to being limited to publically available information. Firstly, using average athlete salary may well underestimate the true financial cost of HSIs. Older, more experienced athletes are likely to be on higher than average salaries and they are also at greater risk of HSIs.<sup>2</sup> In the AFL, HSIs are consistently more prevalent in players aged 26 years and older compared to their younger counterparts.<sup>1</sup> Therefore, when these older, more experienced athletes miss regular season games due to HSIs, there may be a greater financial impact on their clubs. This report also does not consider the financial costs associated with the diagnosis and management of HSIs including imaging, therapeutic modalities, surgical interventions and employment of medical/conditioning staff. A more detailed study would need to consider these costs as well as having access to individual player salaries, to determine the full financial cost of HSIs in the AFL.

The financial impact of HSIs in other sports such as European soccer and American football (NFL) is expected to be even higher where average athlete salaries are far greater than in the

AFL. In European soccer the financial cost of a first team player being injured for one month has been estimated to be around €500,000 (\$718,686AUD).<sup>3</sup> Using this figure and data from the UEFA injury study<sup>4</sup> it can be suggested that an average HSI of 14 days duration may cost approximately €250,000 (\$359,409AUD). Financial cost of HSIs in NFL can also be estimated using similar methods to those employed in this current report. Based on NFL injury surveillance data<sup>5</sup> and median NFL athlete salary the average financial cost of an individual HSI is estimated to be \$96,250USD (\$104,206AUD) and the yearly cost of HSIs per NFL team is suggested to be \$353,469USD (\$382,688AUD).

This report is the first to our knowledge to estimate the financial impact of HSIs in elite sport and should be of interest to sports clubs and organisations operating as multi-million dollar businesses that must justify financial costs and place on-field success as a primary objective. This desire for on-field success may at times come at the price of player safety and injury prevention, such as in the AFL where increased use of player interchange, believed to enhance team performance, has been suggested to increase HSI risk for opposition athletes.<sup>6</sup> It must however be highlighted to these organisations that along with evidence of financial benefits of injury prevention programs,<sup>7</sup> there is also evidence in European soccer of a correlation between lower rates of injury and greater on-field success.<sup>8</sup>

Whilst there is a demand for an increase in the scientific knowledge related to sports injury aetiology and their prevention, the avenues for funding are limited, particularly in comparison to areas such as public health and chronic disease management. Greater awareness of the financial impact of sporting injury may help to highlight the need for further investigation into this area. Ultimately, funding may be sponsored by individual clubs looking to gain a competitive advantage over their competition, by improving their knowledge base within injury prevention which reduces the financial burden of these injuries over time. This would

be expected to result in an increase in the economical return for the investment in their athletes.

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## **FIGURE CAPTIONS**

**Figure 1:** Average yearly financial cost of games missed due to hamstring strain injuries (HSIs) per club per season and average yearly athlete salary over the past 10 Australian football league (AFL) seasons.

**Figure 2:** Average financial cost of a single hamstring strain injury (HSI) shown on the secondary y-axis, compared to average HSI incidence (new HSIs per club) shown on the primary y-axis, over the past 10 Australian football league (AFL) seasons.